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the astronomical determinations of latitude, rising as high as forty-five seconds of latitude in the relative positions of stations on neighboring islands. The study of these discrepancies shows them to be due to local deflections of the vertical in consequence of the powerful attraction of our great mountain-masses. The error produced appears to be greater than in any other part of the world in proportion to the extent of the geodetic work. A discrepancy in longitude of sixty seconds is found to exist between Kailua and Honolulu, 150 miles distant. These longitudes were determined by the British transit expedition, transporting twelve chronometers three round trips between the stations. The mountains of these islands rise above the sea from 4,000 to 14,000 feet. But being surrounded by a depth of ocean of, say, 25,000 feet, the masses are really from 30,000 to 40,000 feet high, fully accounting for the extraordinary deflection of the vertical. Twelve stations have been selected whose positions are precisely determined, and which lie on opposite sides of their respective islands. Mr. Preston will occupy each one, so as to secure at least one hundred observations of pairs of stars. It is believed that a study and comparison of the discrepancies between the latitudes obtained will enable a standard latitude to be determined for the whole group, very closely approximating to the true latitude.

No precise determination of longitude can possibly be obtained until there is cable communication between Honolulu and the continent. It now seems probable that such communication will soon be established. Mr. Preston's work will then be available in corrections to determine a standard longitude as well as latitude for this group. When these corrections for the latitude and longitude are applied to the transit of Venus station at Honolulu, it seems not unlikely that better results may be obtained from the work done by the British transit expedition.

A panorama of the caldera of Kilauea goes today to the United States for public exhibition. It is an accurate representation of the great enclosure, and of the interior active lakes, as seen at the period of culminating action shortly before the periodical collapse which took place last year. The work is by an eminent artist, Jules Tavernier, who is particularly successful in vivid representation of incandescent lava. The whole is lifelike and realistic. Although startling, it possesses a high scientific value, far beyond a mere popularizing of the subject.

Since the collapse, the lava has re-appeared in force, and is slowly rising in the lakes, already presenting brilliant exhibitions. After a period of the highest activity, the lakes suddenly sank out

of sight, leaving deep pits, the bottoms of which were 700 feet lower than the previous level of liquid lava. The surveyor-general embraced the opportunity for a precise survey of Kilauea and its branch craters, which has been completed. It will probably be several years before any thing like the recent high level of lava is again attained. A remarkable phenomenon still proceeding has been the uplifting from the bottom of the pit, as if by colossal jack-screws, of a veritable mountain island of lava more than 500 feet in diameter and 150 feet high, around which the liquid lava flows. This permanent island has already risen some 300 feet within seven months. The best facilities are now given for access to the crater, involving five days' absence from Honolulu, at the cost of fifty dollars, covering all transportation, hotel fare, and guides, with two days at the crater. K.

Honolulu, Jan. 18.

GEOGRAPHICAL NOTES.

Asia.

Dr. A. Bunge and Baron E. Toll have returned from their journey to the New Siberian Islands. They have made valuable collections and observations on the five islands of this group, which of late became so famous by the hazardous boat journey of the Jeannette crew. The results of this, the first scientific expedition to these islands, will be of great interest.

There are new reports on Potanin's expedition to southern Mongolia. His return was announced in the St. Petersburg letter of last issue. Potanin left the district of Koko-Nor on June 25, 1886, crossed the desert of Gobi on a previously unknown route from south to north, and discovered four parallel chains of mountains, which form the south-eastern continuation of the Altai system. The journal of the Imperial Russian geographical society contains a report on his last exploration in the district of Koko-Nor. He explored that part of the Nan-shan mountains which separate the country drained by the Hoang-ho from the plains of southern Mongolia. It is composed of three mountain ranges, with passes 12,800 feet in height, and intermediate valleys at an elevation of 10,000 feet. On his way north he fell in with the Jegurs, a tribe hitherto unknown. Potanin surveyed the whole country he traveled over, and determined the position of seven places by astronomical observations. His companion, the naturalist Beressowski, will stay near Kiachta until next winter in order to complete his collections.

Mr. E. Michaelis, in *Nature* of Dec. 16, states that traces of the ice-period are found in the southern parts of the Altai Mountains. Farther

south, on the northern declivity of the ranges Jarbagatay and Saor, which form the southern limits of the basin of the Irtish, large deposits of boulders are found. They consist of granitic rocks, which have been carried by the ice from the crest of the mountains to a distance of about ten miles, the layer having a direction from south to north. The range of Saor attains a height of about 12,500 feet above the level of the sea. At the present period snow always lies on its highest parts, but no glaciers are found.

According to Nikolsky, Lake Balkash is drying up at the rate of one metre in fourteen or fifteen years. Its southern portion, called Ala-Kul, is being transformed into a salt-pan similar to Kara Bugas, the well-known bay on the east side of the Caspian Sea. As the evaporation is very rapid in those regions, and the bays have no tributaries, the loss of water is replaced by the salt water of the lake rushing through the narrow entrance into the bay, the water of which having become concentrated, the salt is continually being precipitated at its bottom. Some other lakes of West Siberia and the Aralo-Caspian region are also drying up. Jadrienzew, by comparing the extent of the Lakes Suny, Abyshkan, Moloki, and Chany, in the governments of Tobolsk and Tomsk, as represented in maps of 1784, 1813-20, 1850-60, and 1880, proves that they are desiccating at a rapid rate. Lake Abyshkan measured 530 square miles at the beginning of this century, while only three small ponds of one and a half miles in width remain. The same process is going on throughout West Siberia.

According to the *Novoe Vremya*, the trading caravan lately despatched by the Central Asian commercial company Koudrine has passed through Kashgar and entered Thibet. This company is likely to play an important part in Central Asia. It has established permanent agencies at Merv and Askabad, and in the Persian cities of Kutchan and Meshed, and now it proposes to do the like in Thibet. It has received from the Ameer of Bokhara a large tract of land on the banks of the Amu-daria, near the Chardjui station of the Transcaspian railway, for the cultivation of cotton. In the Transcaspian there seems to be a great district suitable for cotton-growing, and there is a general opinion among the commercial classes of Russia that the development of this industry ought to be steadily encouraged by the government.

Africa.

Further news has been received from Dr. Oscar Lenz, dated Kibonge, April 20, Nyangwe, May 19, and Kasonge, June 1. Lenz left Stanley Falls on March 30 in canoes supplied by the famous Ara-

bian trader, Tippo-Tip, who sent several Zanzibari soldiers with him, and gave him about twenty negroes for oarsmen. At the cataracts they had to hire natives, as the work was too hard for the small company. Having left Stanley Falls, they passed through a dreary country, the banks of the river being low and covered with thick forests. On account of high water they had great difficulty in finding places for camping. Lenz found many of the native villages mentioned by Stanley deserted, as the natives had settled farther inland to escape the attacks of the Arabs. He met Zanzibari soldiers belonging to Tippo-Tip's troops in most of the villages, who gave him some trouble by trying to tax him. It took the small caravan seven days to pass the cataracts of Wamanga, having several times to transport their bulky canoes over marshy, bush-covered ground. On April 15 they reached Kibonge, which is largely inhabited by Arabs and Zanzibaris. It is named after the chief who established the village nine years ago. He came from Nyangwe, and is independent of Tippo-Tip. The village is very extensive, and is composed of a great number of ranches, with gardens and fields. Its situation, however, is very unhealthy, as it is built on the low banks of the Kongo, and large lagoons and swamps surround it. As the district is very suitable for rice culture, the Arabs have cleared the land, and grow considerable quantities of rice. Lenz considers these fields far more extensive and numerous than those in West Africa. He left Kibonge in company with several Arabian traders, who were going to Tippo-Tip's station, Riba-Riba. A few days' journey above Kibonge they heard the sounds of the war-drums of the natives, and prepared for defence in case of an attack. Wherever the Arabs have settled, the negroes have fled into the woods, and when they have a chance of attacking the intruders with safety they do so, and the Arabs are in constant fear of their poisoned arrows. The feeling of uneasiness did not subside until they had reached the friendly tribes near Riba-Riba. The latter place derives its name also from its chief, a Nyangwe negro. The river between Nyangwe, and Riba-Riba, and Kibonge is frequented by travelling parties going from one place to another in pursuit of their trade. They extend their journeys far up the tributaries of the Kongo, as far south as Urua, south-west of the Tanganyika. Nyangwe is built on a hill about a hundred feet above the Kongo. It consists of a number of houses surrounded by gardens. The inhabitants are rich Arabian merchants and Zanzibaris and natives who are in their employ. Some houses are well built of sun-dried bricks and have fine piazzas. Kasonge, the headquarters

of Tippo-Tip, is far more important than Nyan-gwe, being the place where caravans to Lake Tanganyika are fitted out. Tippo-Tip, whom Lenz had left at Stanley Falls, arrived at Kasonge about the time of Lenz's arrival, and as he was going to Zanzibar, Lenz feared that he would not be able to get a sufficient number of men for his caravan. Later telegraphic news informs us that Lenz was compelled to abandon his intention of reaching Dr. Junker and Emin Pacha (Dr. Schnitzler), and a short time ago the cable informed us of his arrival at Zanzibar. He has crossed the continent from the mouth of the Kongo to Zanzibar in less than eighteen months.

Lenz's remarks on the Arabian trade with Urua are of interest when compared with the views Captain Cameron expressed at the London institution, on Jan. 11, 1887. While Lenz emphasizes the difficulty the Kongo Free State and other European powers will encounter by Tippo-Tip's powerful influence in Kasonge and Urua, Cameron thinks that, by following the Lomami, the London missionary society's agents and the officers of the Kongo Free State would soon reach this country, and he expresses great hopes of their being able to do away with the horrors of the slave trade which prevails there owing to the Portuguese and Arabs.

Lieutenant Webster, late commander of the station of Stanley Falls, proposes to explore the district between Adamaua and Kameroun. This is the region which Robert Flegel tried to enter from the upper Benué. Here the unknown area almost extends to the coast, and the obstacles arising from the hostility of the native tribes have hitherto prevented all explorers from entering the continent.

The Italian traveller, A. Franzoj, has determined to abandon his intention of crossing the Somal country, on account of the unsettled state of affairs in that district. He will go to Zanzibar, and proposes to follow Thomson and Fischer's route through the Massai district.

Dr. K. Jühlke, of the German East-African company, was murdered in Kismayu in the beginning of December. After having purchased Usagara and the neighboring countries in 1884, he added to the possessions of the company, in June and July, 1885, the district as far north as the Kilimanjaro, and, on his last expedition, that from Vitu to the mouth of the Yuba.

Captain Rouvier, member of the joint commission of France and the Kongo Free State for determining the boundary line of the possessions of both states up to longitude 17° E., has made a survey of his routes, which, it is hoped, will be a great advance in our knowledge of the geography of the Kongo River. His observations show that

Stanley Pool is far smaller than it was supposed to be, and that the positions of many places and rivers require changing.

Henry M. Stanley left Suez on Feb. 6, on the steamer Navarino, for Zanzibar direct.

The German East-African company has been converted into a corporation by a committee of the founders, merchants, and financiers. The board of directors will hereafter consist of twenty-seven members, three of whom are to be nominated by Prince Bismarck. The capital is to be raised to 5,000,000 marks by a further issue of shares.

America.

Dr. P. Ehrenreich and K. von Steinen sailed from Hamburg last week for Brazil. They intend to explore the southern tributaries of the Amazon.

Oceans.

At a meeting of the Paris Academy of sciences on Jan. 10, a report was given of experiments made by the Prince of Monaco to determine the direction of the North Atlantic currents. Of 169 floats thrown overboard 300 miles north-west of the Azores, in 1885, 14 have been recovered, showing a general south-easterly direction and a mean velocity of 3.83 miles per 24 hours. Of the 510 floats thrown overboard in 1886, much nearer the French coast, 9 have been recovered, showing nearly the same direction, with velocities of from 5.80 to 6.45 miles.—*Nature*, Jan. 20.

NOTES AND NEWS.

THE plans of the Johns Hopkins university have always had reference to the establishment of a faculty of medicine whenever the Johns Hopkins hospital should be completed. The buildings are nearly ready to be occupied, and arrangements will be perfected for instruction in surgery and medicine. Meanwhile, courses preliminary to the study of medicine, especially in physics, chemistry, and biology, with the modern languages, are provided in the philosophical faculty. The nucleus of the medical faculty, as now constituted, includes the president of the university, a professor of pathology, a professor of physiology, a professor of chemistry, a lecturer upon hygiene, and an associate in pathology.

— During the past year the Institute of social science of New York has held twenty meetings, at which were presented and discussed the following papers: 'The logical method of studying sociology,' Mr. Parke Godwin; 'An introduction to social science,' T. B. Wakeman, Esq.; 'Principles that should control the interference of the state in